

AFCESA A-GRAM



AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

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INSULATED ABOVEGROUND VAULTED FUEL STORAGE TANKS

SYNOPSIS:

Pressure to replace underground fuel storage tanks has generated a market for insulated aboveground rectangular tanks that do not need dikes and can be placed next to buildings. Features include leak containment, two-hour fire ratings, ballistic protection and vehicle impact resistance.

Capacities - 250 to 12,000 gallons

Cost - \$2,000 to \$25,000 plus accessories. Standards for these tanks are in MIL-HDBK-1022.

CONSTRUCTION:

The **primary tank** is a factory constructed UL 142 welded steel rectangular tank. Minimum wall thickness must be 3/16". Where interior corrosion is a concern, coat the bottom and lower 20 inches of the sides or consider stainless steel. Jet fuel tanks must be stainless steel. All penetrations must be in the top of the tank.

The preferred **exterior** is a steel outer tank. As an alternative, a 6" thick concrete surface, protecting a High Density Polyethylene (HDPE) or equivalent inner secondary containment liner, may be used in limited applications. Most tanks with concrete exteriors are not acceptable as secondarily contained tanks because the concrete tends to deteriorate over time, affecting the integrity of the HDPE liner.

Fire protection comes from the insulating effect of either regular or insulating concrete poured into the interstitial space of the double wall steel tank or the 6" of exposed concrete for the alternate tank. Tanks for flammable liquids located near facilities or with integral fuel dispensers must meet UL-

Standard 2085 "Secondarily Contained Protected Type" specifications and have a UL label so stating. For DoD applications, they must have steel inner and outer tanks providing interstitial containment that is both pressure testable and verifiable. This tank meets or exceeds NFPA 30, 30a, and 31 requirements and Uniform Fire Code (UFC) articles 52 and 79 and provides a minimum two-hour fire rating per UFC appendix Standard A-II-F. This is a quality tank and possibly less costly than alternatives.

Tank accessories vary with the application. Specify 30" manways for tanks 500 to 5,000 gallons and two 36" manways for tanks greater than 5,000 gallons. Include a 15-gallon spill



containment box with locking cap, fill tube, and manual drain; emergency vents for the tank and interstitial space; a 2" pressure vacuum vent valve for the tank; and leak monitoring for the interstitial space. Consider a water draw-off system. For corrosive environments, special finishes such as elastomeric polyurea are available from some manufacturers with warranties up to 30 years.

INSTALLATION:

Provide a reinforced concrete slab foundation and slope the tank to the water

draw-off. Provide protective bollards in traffic areas. Pressure test the tank and interstitial space after installation. For flammable liquids, require containment curbing based on tank filling rates if a spill could enter a critical area. Require anchor holes in support channels for earthquake/hurricane restraint.

LESS CRITICAL APPLICATIONS:

Where normal fire code distances can be met, the tank only has to meet secondary containment requirements as long as it does not dispense fuel through its own self-contained dispenser. In these applications, there are a variety of cheaper alternatives to the rectangular tank where aesthetics are not important.

Where secondary containment is not required, such as heating oil tanks, yet aesthetics are important, consider concrete encased exposed aggregate tanks.

SOURCES:

There are many manufacturers of satisfactory tanks. A list can be found in the UL® Directory for *Gas and Oil Equipment*, product categories EELU (insulated) and EEEV (uninsulated). Go to www.ul.com for directory ordering information. Some tanks are GSA listed in FSC Class 5430 and 4930, Aboveground Fuel Storage Tank Systems, so they may be easily procured. For more information, call GSA, Ft Worth TX, (817) 978-2077

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